Investigation on the effect of pasteurisation on the bacteria contamination of eggs

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Research Question: What is the difference between bacterial contamination on pasteurised and non-pasteurised eggs?

Aim: To educate consumers to store their eggs in fridges. To encourage the consumption of pasteurised eggs over non-pasteurised eggs.

Test 1

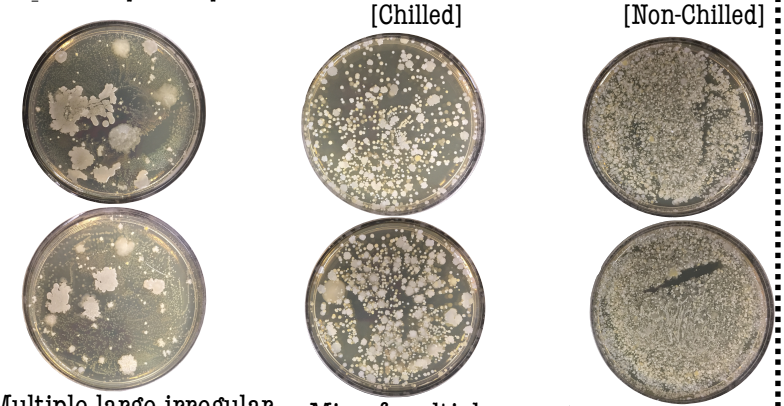
With ref. to Nordenskjold et al's paper (2010)

Aim: Identification of bacterial contamination on egg shell

1)Place an egg in a zip lock bag containing 50ml Luria Broth.
2) Rub the egg for 1 minute.
3) Remove the egg
4) Pipette 100µl of the solution onto a agar plate.
5) Using an L-shape spreader, spread the liquid onto the agar plate.
6) Incubate the agar plate for 23-24hrs.
7) Remove the agar plate and observe the morphology of the colonies.

Results

Pasteurised [Chilled] | Non-Pasteurised [Chilled] | Non-Pasteurised [Non-Chilled]



Multiple large irregular colonies, surrounded by a few punctiforms

Mix of multiple circular & irregular colonies

Large number of punctiforms

Test 2

With ref. to Reu Koen et al's paper (2007)

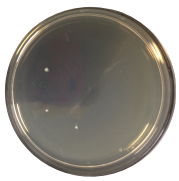
Aim: Identification Of bacterial contamination in egg contents

1) Disinfect the eggshell with hydrogen peroxide (6%) followed by short flaming
2) Break the disinfected egg by hand (with sanitised plastic gloves) using a sterile blade.
3) Mix the egg content.
4) Add 1ml of the egg content into 9ml of Luria Broth
5) Pipette 100µl of the solution onto a nutrient agar plate.
6) Using an L-shape spreader, spread the liquid onto the agar plate.
7) Incubate the plates at 37°C for 18-24h.

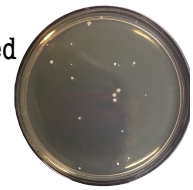
Colony count results

After 43 hours...

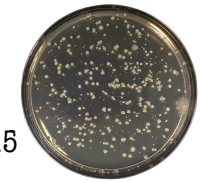
Pasteurised [Chilled]
(3+1)÷2=2

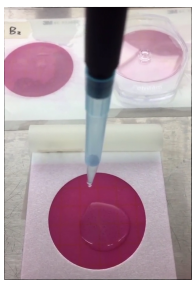


Non-Pastuerised [Chilled]
(17+2)÷2=9.5



Non-Pastuerised [Non-chilled]
(447+364)÷2=405.5





Test 3

Using 3M's petrifilm E.coli/Coliform Count Plate

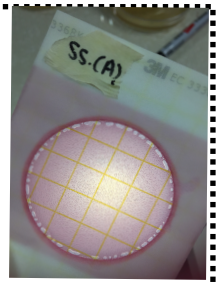
Aim: Identification of type of bacteria on egg shell + Kirby Bauer Test

1) Rub a pasteurised and non-pasteurised egg into 40ml saline solution in a zip lock bag.
2) Pipette 600µl of the solution onto the rapid test kit.
3) Incubate for 23-24h.
4) Observe colony count.

Results

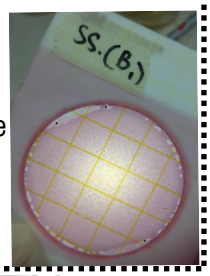
Chilled Pasteurised

★Observations: Gas bubbles near the surroundings. No red-blue colonies formed
★ Avg number of E.coli = 0



Chilled Non-Pasteurised

★Observations: 3 red-blue colonies on first sample surrounded by 5 gas bubbles. 2 red-blue colonies on first sample surrounded by 4 gas bubbles.
★Avg number of E.coli = (3+2)÷2 =2.5



What I learned (Conclusion)

In a nutshell, all eggs have bacterial contamination on and in them. However, pasteurised eggs contain the least amount of bacterial contamination. This is especially evident upon examination of the egg contents. The presence of E.Coli, a type of coliform bacteria was also absent on egg shell of pasteurised eggs unlike those on non-pasteurised eggs. To kill bacteria, eggs have to be cooked thoroughly-firm white and yolk. For dishes with undercooked eggs like sunny side ups, pasteurised eggs are best used since they have the lowest chance of causing food contamination.

Future Research

In future, I would like to research more on the topic of salmonella contamination. Salmonella Enteritis (SE) is a foodborne pathogen commonly found in eggs. I would like to further study this bacteria in other poultry.

Acknowledgments

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Bibliography

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